

WHAT IS CLAIMED IS:

1. A system for reducing electromagnetic interference between two or more co-located antennas coupled to the system, wherein the system comprises:

5

a first antenna configured for transmitting a first signal within a first frequency band;

10 a second antenna configured for operation within a second frequency band during transmission of the first signal; and

15 an apparatus arranged between the first and second antennas for intercepting electromagnetic energy radiated from the first antenna during transmission of the first signal, wherein the apparatus is configured for scattering the radiated energy away from the second antenna to reduce electromagnetic interference at the second antenna.

2. The system of claim 1, wherein at least a portion of the second frequency band overlaps the first frequency band.

20

3. The system of claim 1, wherein the apparatus is positioned proximate to the second antenna.

25

4. The system of claim 1, wherein the apparatus is positioned proximate to the first antenna.

30

5. The system of claim 1, wherein the apparatus is further configured for intercepting electromagnetic energy radiated from the second antenna during transmission of a second signal, scattering the radiated energy away from the first antenna, and reducing electromagnetic interference at the first antenna.

6. The system of claim 1, wherein the system comprises any computing and/or telecommunications system capable of transmitting and/or receiving audio, video and/or data signals over a wireless medium.

7. The system of claim 6, wherein the computing and/or telecommunications system is selected from a group comprising a server, a desktop computer, a notebook computer, a tablet computer, a hand held organizational and/or computational device, a mobile telephone, or a combination thereof.

5

8. The system of claim 1, wherein the system comprises any personal or public transportation system having at least two radio modules coupled thereto for transmitting/receiving signals via the first and second antennas.

10 9. The system of claim 1, wherein the first antenna, the second antenna and the apparatus are coupled to internal components of the system and surrounded, at least in part, by a substantially non-conductive external surface.

10 15 10. The system of claim 9, wherein the first antenna, the second antenna and the apparatus are integrated onto an expansion card or sub-assembly, which is detachably coupled to the internal components of the system.

11. The system of claim 1, wherein the first antenna, the second antenna and the apparatus are coupled to an external surface of the system, and wherein the external 20 surface is configured for supporting and/or encasing internal components of the system.

12. The system of claim 11, wherein a majority of the external surface is formed from an electrically conductive material.

25 13. The system of claim 11, wherein at least a portion of the external surface is formed from a substantially non-conductive material in the immediate vicinity of the first and second antennas and the apparatus.

30 14. The system of claim 11, wherein the first antenna, the second antenna and the apparatus are coupled to the external surface on one side or on different sides of the system.

15. The system of claim 11, wherein the apparatus is arranged between the first and second antennas and coupled to a substantially non-conductive covering that connects to the external surface for protecting and/or concealing the first and second antennas.

5 16. A system for reducing electromagnetic interference between two or more co-located antennas coupled to the system, wherein the system comprises:

10 a pair of antennas spaced apart from one another by a relatively short distance, wherein the pair of antennas are configured for operating within a same or nearby frequency band; and

15 an apparatus arranged between the pair of antennas for intercepting electromagnetic energy radiated from a first antenna of the pair of antennas during transmission of a first signal, wherein the apparatus is configured for redirecting the radiated energy away from a second antenna of the pair of antennas to reduce electromagnetic interference at the second antenna.

20 17. The system of claim 16, wherein the relatively short distance between the first and second antennas is dependent on a wavelength of the first signal and a dimension of a surface upon which the antennas are coupled to the system.

25 18. The system of claim 17, wherein the first and second antennas are positioned along the dimension near opposite ends of the surface to maximize the relatively short distance therebetween.

19. The system of claim 18, wherein the dimension of the surface is less than or equal to about 1 m.

30 20. The system of claim 19, wherein the electromagnetic energy radiated from the first antenna propagates through free space as a plane wave having minimum and maximum electromagnetic energy levels at various locations along the surface, wherein the various locations correspond to fractional amounts of the wavelength of the first

signal, and wherein a receiving end of the second antenna is positioned at a location of minimum electromagnetic energy.

21. The system of claim 20, wherein a center of the apparatus is positioned
5 proximate to the second antenna at a location of maximum electromagnetic energy.

22. The system of claim 20, wherein a center of the apparatus is positioned proximate to the first antenna at a location of maximum electromagnetic energy.

10 23. The system of claim 22, wherein the apparatus provides an insertion loss of about -25 dB to about -35 dB when the receiving portion of the second antenna is positioned approximately one wavelength away, and the center of the apparatus is positioned approximately $\frac{1}{4}$ wavelength away, from a transmitting portion of the first antenna.

15 24. The system of claim 23, wherein the insertion loss is provided over a wide range of band-gap frequencies including any carrier frequencies used by the first and second antennas and extending from a) the lowest carrier frequency used by the first and second antennas to b) approximately two to four octaves above the lowest carrier
20 frequency.

25. A system for reducing electromagnetic interference between two or more antennas attached to the system, wherein the system comprises an apparatus configured for:

25 intercepting electromagnetic energy radiated from a first antenna of the system during transmission of a first signal;

30 using the intercepted radiated energy to produce a plurality of standing wave patterns, which combine to scatter the intercepted radiated energy away from a second antenna of the system; and

reducing electromagnetic interference at the second antenna without absorbing the radiated energy or decreasing a transmitted power level of the first signal.

- 5 26. The system of claim 25, wherein the apparatus comprises a plurality of resonant circuit elements formed in a linear or array pattern, wherein the plurality of resonant circuit elements are specifically designed to produce the plurality of standing wave patterns at a carrier frequency of the first signal, wherein dimensions of the plurality of resonant circuit elements are substantially less than one-tenth of a wavelength of the first signal, and wherein a length of the apparatus is approximately equal to one-half of the wavelength of the first signal.
- 10
- 15 27. The system of claim 25, wherein the apparatus is electrically isolated from all power sources and/or ground nodes coupled to the system, thereby enabling the apparatus to reduce the electromagnetic interference without increasing system power requirements.
- 20 28. The system of claim 27, wherein a means for coupling the apparatus to the surface electrically isolates the apparatus from other components of the system and enables the apparatus to resonate freely.